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the attachments of a professor have been mostly to his university rather than to the fellowship of his particular science. Of recent years, with the organization of national scientific societies, some change has occurred in this respect. It is to guilds of scholars, whether formally organized or not, that we must look for setting the standard of scholarly production. The fellowship of scholars can only be a matter of gradual development, and their standards also must grow and can not be suddenly and artificially raised; but there is plenty of evidence that the standards of our scholarly guilds have been rapidly improving, and they will probably continue to improve. Such guilds possess rewards and punishments of their own, for the standing of a man among his fellows is one of the strongest incentives to action. The standards of the guilds must eventually be the standards of the universities; and thus we hold in our own hands, quite apart from the momentary attitude of university authorities, a force capable of raising the level of our own work and that of our successors.

R. S. WOODWORTH

COLUMBIA UNIVERSITY

#### BIOLOGICAL TEACHING IN SECONDARY SCHOOLS

A MEETING of men interested in the advancement of biological teaching in secondary schools was held at the Harvard Union, Cambridge, on Saturday, February 4. Those present were Professor G. H. Parker, Harvard University; Principal Irving O. Palmer, Newton Technical High School; Dr. H. R. Linville, Jamaica (N. Y.) High School; R. H. Howe, Jr., Middlesex School; Samuel F. Tower, Boston English High School; S. Warren Sturgis, Groton School; Head Master Frank E. Lane and W. L. W. Field, Milton Academy. The relation of school biology to civics, the sequence of laboratory experiments, outdoor work with classes and college requirements were the topics informally discussed. The undersigned was authorized to communicate with other teachers with a view to establishing a series of conferences, perhaps to be held alternately in Boston and New York.

Correspondence is accordingly invited from interested readers of this notice.

W. L. W. FIELD

MILTON ACADEMY,

MILTON, MASS.,

February 6, 1911

#### SCIENTIFIC BOOKS

*Questioned Documents.* A Study of Questioned Documents with an Outline of Methods by which the Facts may be Discovered and Shown. By ALBERT S. OSBORN. With an Introduction by Professor JOHN H. WIGMORE. Two hundred illustrations. Rochester, N. Y., The Lawyers' Cooperative Publishing Co. 1910. Pp. xxiv + 501.

"Questioned Documents" is an admirably clear presentation of the application by experts of modern scientific methods to the study of handwriting. It gives a detailed exposition of the use in the identification of handwriting of enlarged photographs taken in various lights, of the document microscope and of the color microscope designed for recording the tints and shades of ink. The instruments and appliances used in getting accurate measurements of such details of writing as the width of the line-stroke and the slant of various parts are also described. Particularly interesting is the suggestion of the new application of stereoscopic photography in such a way as to determine in disputed handwriting the sequence of crossed lines, the time-relation of writing to folds in paper and the presence of erasures and changes in paper-fiber.

The purpose of the book is practical—a very successful attempt to present the science of handwriting in relation to law, an attempt which constitutes a new and profitable departure in legal literature. The author would arouse the interest of the trial lawyer in, and his intelligent comprehension of, the problems involved in questioned documents, so that he may be better qualified to deal with situations involving such matters. Those interested in the pure science of handwriting will, none the less, find much to learn from the author relative to its accurate measurement and analysis. The reviewer is acquainted with no other

treatment of the subject from the practical standpoint as thoroughgoing and suggestive.

Since the psychology of individual variation in handwriting characteristics is still an unwritten chapter of the science, it is not surprising that the analysis of handwriting habits in the volume under consideration should be largely in terms of the writing system learned by the penman and of the writing instruments and material utilized by him. Such an analysis is accompanied by an historical account of the rise of various systems of handwriting and by a description of their characteristics. The dependence of many peculiarities of writing, such, for example, as shading, upon pen position, should be noted by the investigator of the subject. The author insists upon the use of a sufficient amount of proved handwriting as a standard for comparison in the case of a disputed document and records instances of normal variation in handwriting in such a way as to show forgery by a tracing-process in the case of unnatural uniformity. The interesting observation is made that individual writing habits are found to be revealed more clearly in minor details than in striking features, such as large capital forms. Possibly the author might, with profit, have treated at greater length variations in handwriting due to age, disease and emotional disturbance.

The author insists that the testimony of the handwriting expert should, if acceptable, be the expression not of an opinion founded upon more or less vague intuitions, but of a scientific conclusion from facts, a conclusion based upon reasons which are intelligible to the non-expert and presentable in court. The author is sceptical of testimony that concerns itself with the general appearance of handwriting rather than with accurate analysis and measurement. He is, naturally, amused by the pretensions of the graphologists who would read from handwriting the physical characteristics of the penman and catalogue therefrom his vices and virtues.

The application by the author of the methods used in identification of handwriting to the study of questioned typewriting shows a

new field of inquiry, one that appears well worth working by the expert.

JUNE E. DOWNEY

UNIVERSITY OF WYOMING

*Tables for the Determination of Common Rocks.* By OLIVER BOWLES, M.A., Instructor in Geology and Mineralogy, University of Minnesota. 16mo. Pp. vii + 64. New York, D. Van Nostrand & Co. 1910. \$0.50.

This text is designed to meet the need of suitable tables for the determination of rocks and rock-forming minerals by microscopic methods and constitutes a convenient and useful pocket guide for field and laboratory purposes.

The usual classification of rocks is given but no attempt is made to group them in the tables accordingly. The grouping, based upon texture, is I., Glassy; II., Ashy or Cellular; III., Crystalline, even grained; IV., Porphyritic; V., Dense and Finegrained; VI., Banded; VII., Fragmental. The various types are arranged in the proper group and described briefly. In the case of crystalline rocks, mineral composition is made a basis for further subdivision and one chapter is given to tables for the determination of the more common rock-forming minerals, the classification being based upon color, hardness and cleavage.

The last chapter contains a short discussion of building stones. Terms used in the text are amply defined in a glossary at the end of the book.

R. W. CLARK

MINERALOGICAL LABORATORY,  
UNIVERSITY OF MICHIGAN

#### SCIENTIFIC JOURNALS AND ARTICLES

THE contents of the *American Journal of Science* for March are:

"Transmission of Light through Transparent Inactive Crystal Plates, with Special Reference to Observations in Convergent Polarized Light," F. E. Wright.

"Separation and Estimation of Barium Associated with Calcium and Magnesium, by the Action of Acetyl Chloride in Acetone upon the Mixed Chlorides," F. A. Gooch and C. N. Boynton.